

مادة الأحياء

السنة التحضيرية بالجوف

إعداد

أخوكم ومُحبكم في الله

مُحب الشريم

لا تنسوني ووالدي من صالح دعائكم

أَنْ أَصِيبَ فَمَنْ اللَّهَ وَأَنْ أَلْطَأَتْ فَمَنْ نَفْسِي وَالشَّيْطَانَ

Biology

Living Organisms

Plants
(نباتات)

Animals
(حيوانات)

Microorganisms
(كائنات دقيقة)

1- Bacteria
بكتيريا
2- Viruses
فيروسات
3- Fungi
فطريات
4- Algae
طحالب

01- Botany: **study plants** .

02- Zoology : **study animals** .

03- Anatomy : **study structures that make up living organisms** .

04- Physiology : **study functions of structures that make up organisms**.

05- Genetic : **study heredity of living organisms** .

06- Microbiology : **study tiny (small) microscopic living organisms** .

07- Taxonomy : **study classification of living organisms** .

08- Ecology : **study relationships between living organisms and environments** .

09- Parasitology : **study parasites** .

10- Entomology : **study insects**.

11- Virology : **study viruses** .

* Life is found on the planet earth due to :-

1- Water . 2- Gravity . 3- Air (Oxygen) . 4- Light . 5- Suitable temperature .

* Characteristics of Life :-

**1- Nutrition . 2- Growth . 3- Movement. 4- Respiration . 5- Excretion .
6- Reproduction . 7- Response to stimuli (sensation) . 8- Death .**

* Nature of science :- Science is cumulative .

- The scientific method :-

- 1- Ask a question .
- 2- Back ground research .
- 3- Form a hypothesis .
- 4- Test the hypothesis .
- 5- Analyze the results .
- 6- conclusions : to say yes or no the hypothesis .
- 7- Report .
- 8- Retest the work .

* Theory : explanation of some observations based on proven hypothesis and tested many times by different researchers .

Cell structure

Cell :- is the basic building unit of organisms .

Unicellular organisms :- composed of only one cell as bacteria , Amoeba , Yeast .

Multicellular organisms :-composed of more than one cell as plant,Animals,human .

* There are two types of organisms according to their cell :-

- 1- Prokaryotes . 2- Eukaryotes .

	Prokaryotes	Eukaryotes
Typical organisms	Bacteria	Fungi , Plants , Animals
Type of Nucleus	No true Nucleus	True Nucleus (With nuclear membrane)
Organelles	None	Present and highly structured
Cell division	Binary fission	Mitosis and meiosis

* Comparison between plant and animal cells :-

	Animal cell	Plant cell
Cell wall	Absent	Present
Chloroplast	Absent	Present
Lysosomes	Present	Absent
Centrosome (centriols)	Present	Absent
Vacuole	Small and much	One and big

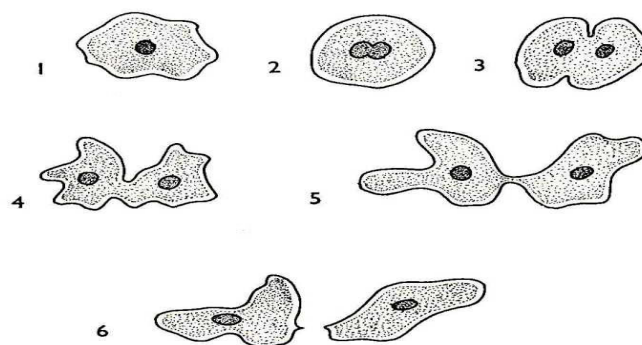
- * **Cell wall** : dead material that supports and protects the cell .
- * **Cell membrane** : controls movement of substances in out of the cell .
- * **Nucleus** : controls cell activities .
- * **Chloroplast** : uses solar energy to make photosynthesis .
- * **Ribosome** : produces protein and found on the surface of RER
(**Rough endoplasmic reticulum**)
- * **Golgi apparatus** : forms the secretions of the cell .
- * **Endoplasmic reticulum** : found into two types :
 - 1- **Rough endoplasmic reticulum (RER)** : site of protein synthesis .
 - 2- **Smooth endoplasmic reticulum (SER)** : site of lipid synthesis .
- * **Mitochondrion** : breaks down sugar molecules into energy .
- * **Lysosome** : digests old cell parts and large food molecules .
- * **Centrosome** : consists of two centrioles that help in cell division .
- * **Cytoskeleton** : maintains the shape and the size of the cell .
- * **Vacuole** : stores food, water and wastes .

Cell division

Cell division : the process by which a parent cell division into two or more daughter cells .

Binary Fission : the simplest way of cell division .

The cell splits into two identical genetic composition cells .



Binary fission in amoeba

Mitosis

Mitosis : the process by which new body cells are produced .

* Mitosis occurs for two reasons :

1- Growth . 2- Replacing damaged or old cells .

* Phases of mitosis :

1- Interphase :

- Cell is preparing itself to divide .
- Genetic materials double .
- Chromosomes appear .

2- Prophase:

- Each chromosome consists of two chromatids joined by a centromere .
- Centrioles move to the opposite sides of nucleus .
- Nucleolus disappears .
- Nuclear membrane disintegrates .

3- Metaphase:

- Chromosomes arrange at equator of cell (middle of cell) .
- Chromosomes attached to spindle fibers by centromeres .

4- Anaphase :

- Spindle fibers contract pulling chromatids to the opposite poles of the cell .

5- Telophase :

- Chromosomes uncoil and appear as chromatin .
- Spindle fibers disintegrate .
- Nuclear membrane forms .

6- Cytokinesis :

- A cleavage furrow of cell membrane at the middle of the cell is formed to form two daughter cells of same size .

* Differences in mitosis between animal and plant cells .

1- There are no centrioles in the plant cell .

2- There is no cleavage furrow in plant cell but a cell plate is formed .

Tissues

Tissue : is a collection of cells having the same shape structure and function .

- **Plant tissue** : 3 main types of plant tissues :-

- 1- The Surface (Dermal tissue).**
- 2- The Ground tissue .**
- 3- The Vascular tissue .**

1- Epidermis (Surface tissues) :

- Thin layer covered with cuticle (waxy layer) .
- Forms a protective layer on the outer surface .
- Stomata are usually found on the lower surface of leaves and help in gas exchange .

2- Ground tissue : 3 types of ground tissue :-

1- Parenchyma . 2- Cholenchyma . 3- Sclerenchyma .

	Parenchyma	Cholenchyma	Sclerenchyma
Structure	Thin – walled cells found in leaf , stem , root and pith .	Thick – walled cells found in stems .	Double thick – walled cells found anywhere in plant .
Function	Photosynthesis and storage .	Provides support and flexibility .	Gives support and strength to plant .
types	One type .	One type .	Sclerids and fibers .

3- Vascular tissue : 2 types of vascular tissue.

1- Xylem . 2- Phloem .

	Xylem	Phloem
Structure	Narrow primary xylem (protoxylem) and wide secondary xylem (metaxylem) .	Sieve tubes and companion cells
Function	Transport water and minerals from root to leaves . Also make support for plant .	Transport solutes from leaves to all parts of the plant . Also used for storage .
types	Vessels and trachides .	One type .



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- **Animal tissue** : 4 groups of animal tissues :-

1- **Epithelial tissues** :

- Cover the surface of organs or body .
- Characterized by very little intercellular substances (matrix) .
- Cells resting on a basement membrane .
- Perform functions as protection , sensation , absorption and trans protection .

2- **Connective tissues** :

- Has large amount of intercellular substance .
- Never found on the surface .
- Do not rest on a basement membrane .
- The main function is to connect and support other tissues and organs together .

3- **Muscular tissues** :

- The only tissues in the body the can contract and relax .
- Made of contractile muscles cells called muscle fibers.

3 main kinds of muscles :-

- A) **Smooth muscle** : found in the walls of viscera and work without the will of animals and celled (Involuntary muscles) .
- B) **Skeletal muscles** : connected to the skeleton of the body and work under the will of the animal .
- C) **Cardiac muscles** : are only found in the wall of the heart .

4- **Nervous tissues** :

1- **Brain** . 2- **Spinal cord** . 3- **Nerves** .

Nerve cells or Neurons are specialized for the conduction of electrical impulses from organ to brain and vice versa .

Classification of living organisms

Classification : is the grouping of organisms based on their characteristics .

Taxonomy : the branch of science of grouping and naming organisms .

Binomial nomenclature :

Scientific names :-

- 1- **Genus name** : written first and always capitalized .
- 2- **Species name** : written second and never capitalized Both words are italicized or underlined .

Example : **Vicia faba** .

* Levels of classification :

- 1- Kingdom . 2- Phylum . 3- Class . 4- Order .
5- Family . 6- Genus . 7- Species .

Robert Whittaker (1969) composed a system for classification that consists of 5 kingdoms :

- 1- Kingdom : Monera . 2- Kingdom : Protista . 3- Kingdom : Fungi .
4- Kingdom : Plantae . 5- Kingdom : Animalia .

1- Kingdom : Monera :-

- A- Prokaryotic organisms . B- Have cell wall .
C- Lack organelles . D- Lack multicellular forms .

Example : **Bacteria , blue – green algae .**

2- Kingdom : Protista :-

- A- Eukaryotic forms . B- Eukaryotic that are not fungi , animals or plants .

Example : **Amoeba , some algae .**

3- Kingdom : Fungi :-

- A- Eukaryotic organisms . B- Heterotrophic . C- Usually multicellular .

Example : **Mushrooms , yeast .**

4- Kingdom : Plantae :-

- A- Immobile multicellular eukaryotes .
B- Autotrophic (produce their food by photosynthesis) .

Example : **Pine trees .**

5- Kingdom : Animalia :-

- A- Multicellular , heterotrophic , eukaryotes .
B- Capable of mobility .
C- Lacking cell walls .

Example : **Worms , spiders , humans .**

* Binomial nomenclature : **it is a two word system for writing scientific names .**

* Chromosomes thicken , shorten and become visible during prophase .

* Cell : **is unit of structure and function .**

